REMARKS

Reconsideration and allowance of the subject application are respectfully requested.

Claims 1-4 are pending in this application. Claim 5 has been cancelled. Claim 1 has been amended to essentially incorporate the subject matter of claim 5 by deleting m is 0.

No new matter has been added.

The applicants respectfully traverse the rejection of claims 1-5 under 35 USC 103(a) over Kodama et al. (EP 1,277,726A1) in view of Harayama et al. (US 2004/0116299A1). These references do not make the presently claimed invention to be obvious.

Pursuant to the amendment of claim 1, as shown above, the recitation of -$S(O)_m$- in formulas (II) and (III) is now -SO-.

Accordingly , the presently claimed method is now recites a method which comprises the steps of introducing a halogen atom in o-position of the benzene nucleus of the sulfoxide (II) to obtain halogenated sulfoxide (III) and then oxidizing the halogenated sulfoxide (III) to sulfone (I) [i.e., sulfoxide ⟶ halogenated sulfoxide ⟶ halogenated sulfone] .

In contrast, Kodama discloses a production route in which a sulfide is oxidized to sulfone [i.e., sulfide ⟶ sulfone], and Harayama discloses a method of introducing a halogen atom into o-position of the benzene nucleus of a sulfide or sulfoxide [sulfide or sulfoxide ⟶ halogenated sulfide or sulfoxide] .

Thus, the claimed route [sulfoxide ⟶ halogenated sulfoxide ⟶ halogenated sulfone] is different from the route of Kodama, [sulfide ⟶ sulfone] . It is also different from the route of Harayama, [sulfide or sulfoxide ⟶ halogenated sulfide or sulfoxide].

Upon consulting Kodama and Harayama, the person of ordinary skill in the art would have been motivated to try a route comprising oxidizing a sulfide to the corresponding sulfone and halogenating the sulfone with Pd catalyst to obtain the halogenated sulfone [sulfide ⟶ sulfone ⟶ halogenated sulfone]. Alternatively, the skilled person in the art would have been motivated to try a route comprising halogenating a sulfide with Pd catalyst to obtain the corresponding halogenated sulfide and oxidizing the halogenated sulfide to the halogenated sulfone [sulfide ⟶ halogenated sulfide ⟶ halogenated sulfone] .

However, one of ordinary skill in the art would **not** have found any disclosure or suggestion, nor have been motivated, to try to make a halogenated sulfone through the presently claimed route, because the route is significantly different in that it is an indirect route via sulfoxide with two steps of oxidation.

Unexpectedly, the route of the presently claimed method has achieved significant reduction of the required amount of Pd catalyst and improvement of the yield of the final product by detouring sulfoxides (II) and (III).

This has been clearly demonstrated in the examples of the present specification.

Accordingly, Examples 1 and 2 start from a sulfide. The final product is obtained in a yield of about 80% while the amount used of Pd catalyst is 1/10 the amount of the sulfide.

In contrast, Examples 3-8 start from a sulfoxide. The final product is obtained in a yield of about 80% to close to 90% while the used amount of Pd catalyst is 1/100-1/1000 the amount of the sulfoxide.

The results of the Examples 1 and 2 compared with the results of Examples 3-8, discussed above show new and unexpected results of the presently claimed invention.

In order to further demonstrate the superiority and new and unexpected results of the presently claimed invention, the applicants preformed side-by-side comparative experiments as set forth in the attached Rule 1.132 Declaration.

The applicants ask the Examiner to carefully study the attached Declaration.

In the Declaration, the applicants have: 1) repeated Examples 4 and 5 of the present application, and 2) repeated Examples 4 and 5 of the present application, except that the sulfoxide was replaced with the corresponding sulfide, thus representing the route of the cited prior art. The experimental results are set forth in the table on the second page of the Declaration.

The experimental results shown in the table clearly show a profound reduction (over 300% reduction) of the required amount of Pd catalyst and improvement in the yield of the final product. This has been achieved by the route according to the presently claimed invention which uses a sulfoxide as the starting material.

The comparative, experimental results set forth in the Rule 132 Declaration demonstrate new, unexpected and superior results of the presently claimed method.

The presently claimed invention is fully allowable under Section 103(a) over the prior art references.

Thus, the applicants submit that a person of ordinary skill in the art would not have been led to the presently claimed invention in view of Kodama and Harayama. The presently claimed invention is fully allowable under Section 103(a) in view of the prior art.

The applicants respectfully traverse the rejection of claims 1-5 on the ground of nonstatutory obviousness-type double patenting over claims 1 and 4 of US 7,057,067 (US '067) in view of Harayama et al. These references do not make the presently claimed invention to be obvious.

Pursuant to the amendment of claim 1, as shown above, the presently claimed invention is a method which comprises the steps of introducing a halogen atom in o-position of the benzene nucleus of the sulfoxide (II) to obtain halogenated sulfoxide (III) and then oxidizing the halogenated sulfoxide (III) to sulfone (I)

[sulfoxide ⟶ halogenated sulfoxide ⟶ halogenated sulfone] .

US '067 fails to disclose or suggest the step in the presently claimed method of oxidation of a halogenated sulfoxide. Therefore, the presently claimed method differs from the subject matter of claims 1 and 4 of US '067, and is certainly not obvious in view of the cited US '067 claims.

The teachings of Harayama do not remedy the deficiencies of US '067 claims 1 and 4. Harayama discloses the step of oxidizing a sulfide to a sulfone, it neither discloses nor suggests the second step of the presently claimed invention of oxidizing a halogenated sulfoxide to a sulfone. Accordingly, the combined teachings of the US '067 claims and Harayama do not make the presently claimed invention to

be obvious.

Moreover, the applicants submit that a person of ordinary skill in the art would not be led to combine the teachings of Harayama with the US '067 claims 1 and 4. There is no suggestion or motivation to combine the two references because of the significant disparity in their teachings. The applicants assert that the combination of US '067 claims 1 and 4, plus Harayama is not tenable and should accordingly be withdrawn.

Even if the combined teachings of the US '067 claims 1 and 4, plus Harayama were considered, then such combination would not make the presently claimed method to be obvious for the reasons discussed above.

The presently claimed invention is no where disclosed, suggested or made obvious by the combination of US '067 claims 1 and 4, plus Harayama. The presently claimed invention is fully allowable over the cited references.

In view of the above and the attached Rule 132 Declaration, it is believed that this application is in condition for allowance and a Notice to that effect is respectfully requested.

Respectfully submitted,

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